MEMORANDUM

DATE:	March 14th, 2016
FROM:	Eric Lancaster
SUBJECT:	March Weekly Progress Report @ Gold King
TO:	Steven Way

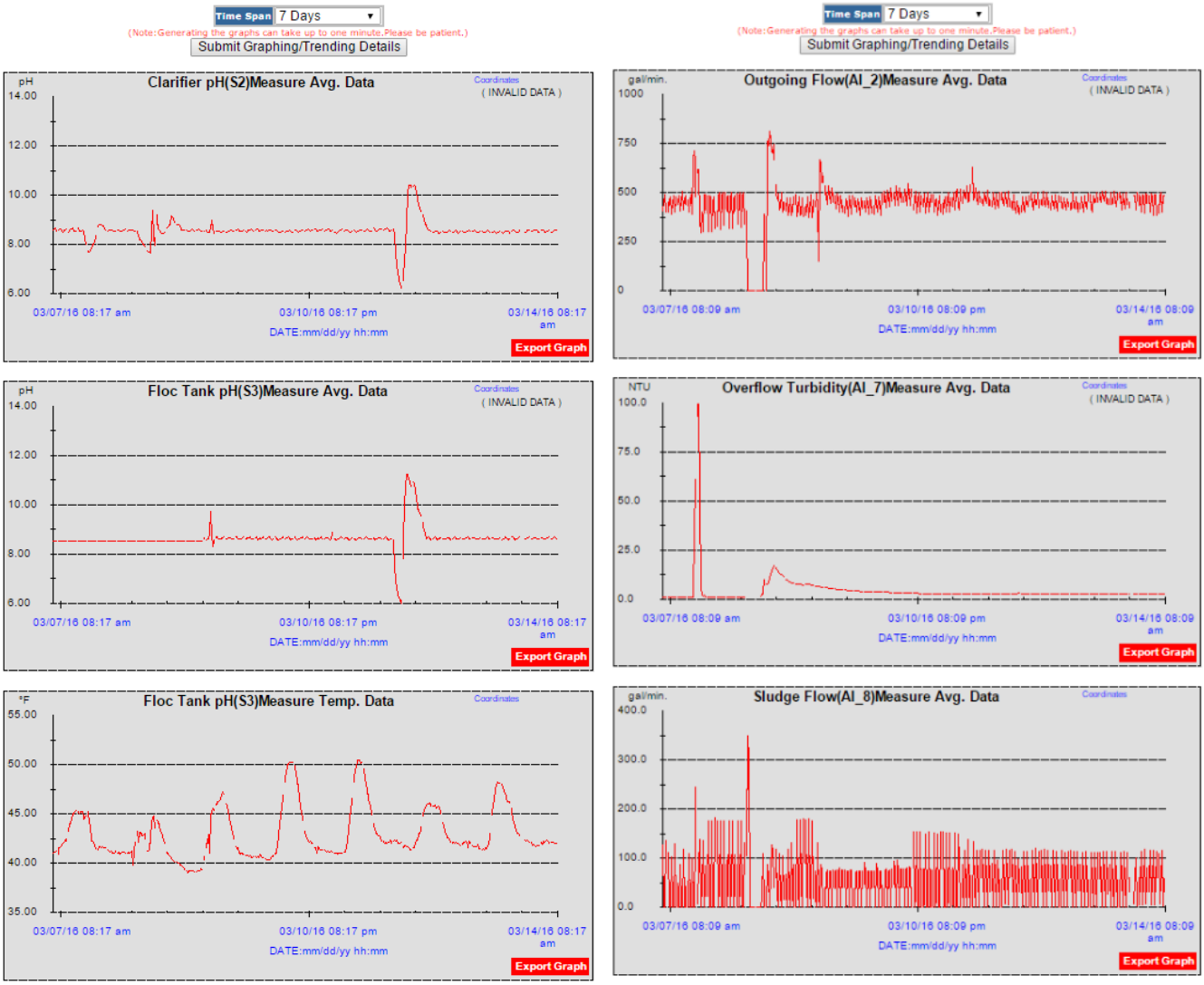
Project: Gold King Interim Water Treatment Plant (IWTP)
Location: Gladstone, Colorado
Prepared for: Emergency Response Unit – US EPA Region 8

Reporting Period: Mar 7 – Mar 14
Report No.: 12

I. General Operations Summary:

IWTS Function/Upsets

- The following graphs provide trending information collected by datalogging equipment during the previous 7 days. These dataloggers collect control information from the Lime Circuit (left) and Flow Circuit (right) Programmable Logic Controllers (PLCs) at the Gold King IWTP. Over the reporting period (3/7/16 – 3/14/16 inclusive) Alexco treated 4.33 million gallons at an average flow rate of 430 gpm with all discharged treated water leaving the 12" HDPE pipeline.



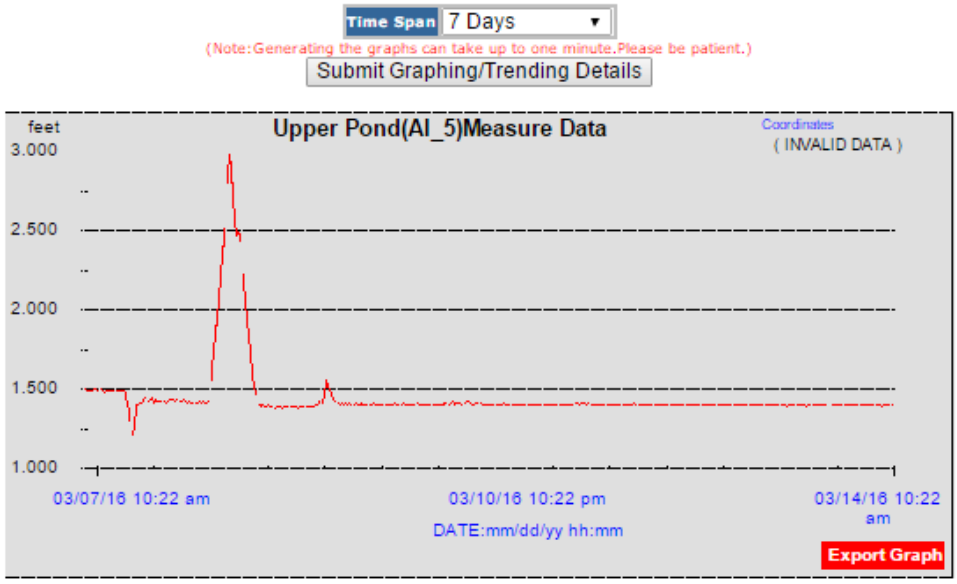
- Please note: Several days each week, the Alexco operators check the pH at both the floc tank and clarifier discharge. During this time, the probe is placed in vinegar (acid), and three pH buffers – 4, 7, and 10. While the probe is in the acid/buffer, the datalogger may captured one of those points for tracking purposes, which explains the occasional pH spikes seen on the graph.
- On 3/8/2016 Alexco shut-down the IWTP, retaining Gold King water in Ponds 1 and 2. During this shut-down the incoming 8" HDPE line was replaced with a 12" steel line, maintenance was performed on the clarifier, and a 3" knife-gate valve was installed at the sludge release flange on the clarifier. This shut-down is shown on the outgoing flow graph where the discharge rate dropped to zero for several hours.
- On 3/12/2016, at 1:30am, the 6" PVC pipe that funnels lime powder to the lime slurry tank became misaligned. Because make-up lime powder was not entering the lime slurry tank, the pH began to drop until an operator arrived at 4:30am and corrected the problem. The system then rebounded and overshot the pH set-point until equilibrium was re-established. The operators will secure the pipe so misalignment does not happen in the future.

Communication System Function Status

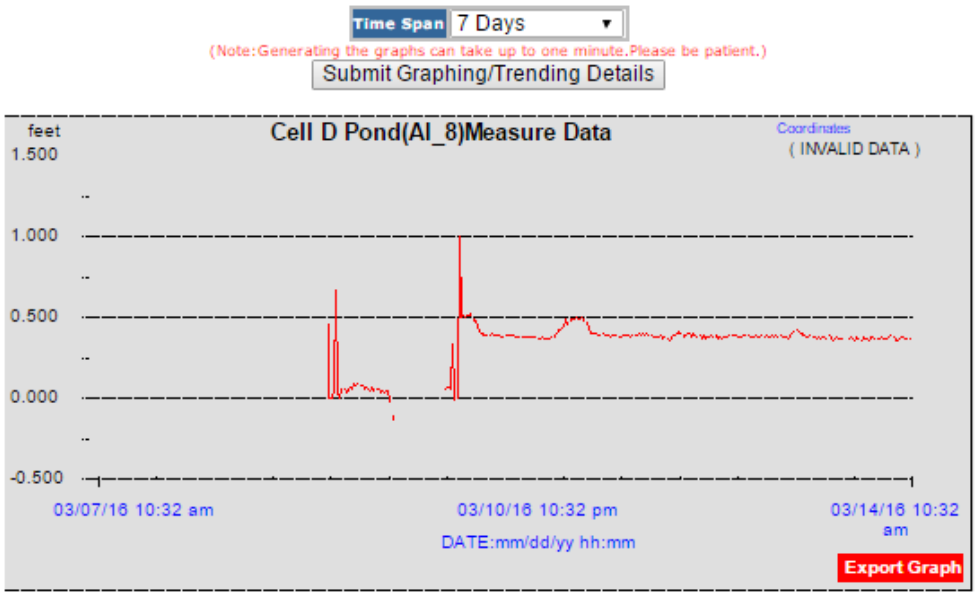
- No issues – reliable operations during the reporting period.

Facility or System Related Work, including Repairs & Completions

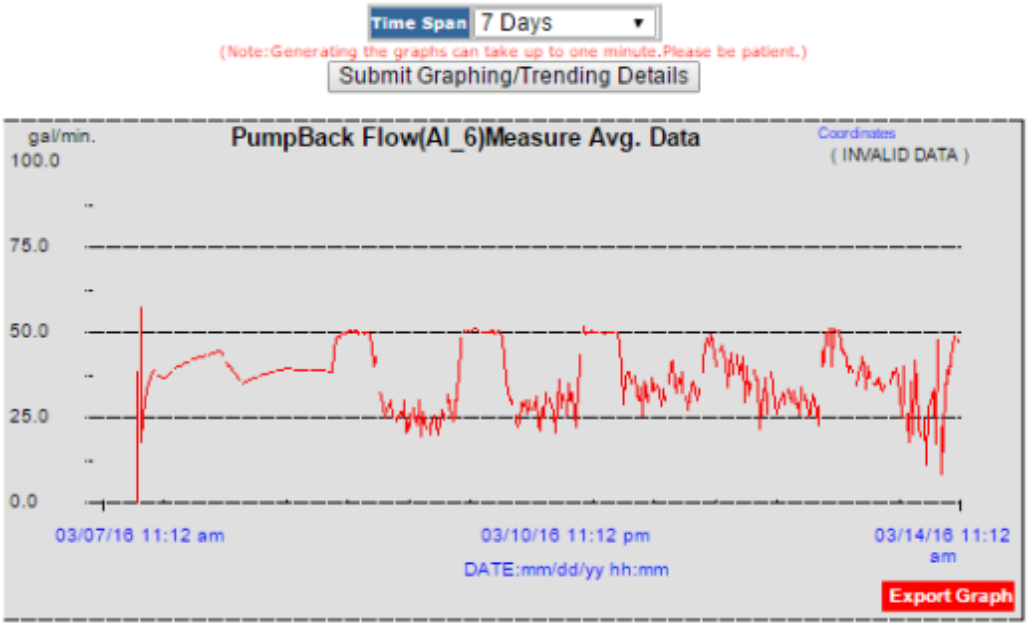
- On 3/7/2016 Alexco and EPA hosted a tour of the IWTP.
- On 2/22/2016, Alexco installed a solar-powered/wireless pressure transducer in the upper lined pond. This new system provides remote monitoring of Pond 2 levels. Since installation, the head on the pressure transducer has been steady at a little less than 1.5 feet, and the system responded accurately on 3/8/2016 when an operator shut-off the IWTP intakes and Pond 2 levels rose to roughly 3 feet. See Figure 2.



- On 3/9/2016, Alexco installed a second solar-powered/wireless pressure transducer near the berm that holds back water within Cell D. This new system provides remote monitoring of Cell D levels. If the levels in the Cell begin to rise, caused by a failure of the pumpback system, the local and remote Alexco personnel will be immediately notified. Since installation, the head on the pressure transducer has been steady at around 0.4 feet. See Figure 3.



- On 3/9/2016, Alexco and ER made improvement to the berm that holds back water within Cell D. See Figure 3.
- On 3/7/2016, Alexco connected the pumpback flow meter to the PLC allowing for remote monitoring of the pumpback flow rates. In addition, alarms have been set so that if the flow drops below 10 gpm (pump failure) the local and remote Alexco personnel will be immediately notified.



II. Identified Problems, Causes, and Solutions (Planned or Implemented)

- **Electrical Permit Closure** – Alexco has asked Precision Electric and Durango Electric to provide a fixed cost quote to make final updates/changes to the IWTP based on an e-mail from Don Nowlin dated 2/22/2016. This e-mail lists the following issues:
  - Cable tray shall be listed
  - Cords/cables installed in tray shall be listed for such use
  - Cords shall be installed with strain relief
  - Cords/cables shall be protected/secured between tray and equipment

- **Replacement of Incoming Flow Meter** – Alexco planned to remove and re-install the incoming flow meter at a better location on the 12" HDPE pipeline near the clarifier. Unfortunately, the HDPE saddle that Summit Mechanical (sub-contractor) brought was incompatible with the resistive HPDE electric heater. A new saddle will be ordered and installed in the near future.
- **Discharge flow meter malfunction** – Alexco discovered that at flow rates above 800 gpm the discharge flow meter malfunctions. It is assumed that an excessive amount of entrained air is causing issues with the magmeter, but further investigation is needed to accurately identify and correct the problem.
- **Valve Shut-off** – The Alexco operators can easily access two 8" butterfly valves that control the incoming flow rate to the IWTP. It was discovered these valves cannot be completely shut, and instead allow water to leak past at roughly 50 to 75 gpm. It is believed that build-up, fibers, or other material is causing a blockage and the valves require maintenance in the near future.
- **Stress Test** – Without accurate incoming and/or outgoing flow meters that can measure rates above 800 gpm, the IWTP stress test was delayed. This test will be rescheduled.
- **Excessive Sludge** – Prior to shutdown, roughly 12" to 18" of thick sludge was identified in Ponds 1 and 2. Alexco and ER need to consider possible removal options prior to spring runoff.
- **Spring Melt Contingency Planning:**
    - **Thickener/Clarifier** - Alexco is currently considering options to thicken the sludge that is collected from the existing clarifier and sent to the bags for dewatering. It is estimated that the current slurry is comprised of 0.5% - 0.75% solids at a flow rate between 35 to 60 gpm average. With the installation of a thickener/clarifier, the discharge rate could be reduced to between 5 to 20 gpm average with solids averaging between 1% and 3%.
    - **Additional Bags** – Alexco has purchased additional textile bags (2X 125' x 45 and 1X 90' x 45') that are currently located at site and can contain up to 2,000 CY of sludge. Alexco is planning to install one or two of these additional textile bags if needed prior to or during spring melt depending on access and snow cover. These new bags should demonstrate improved performance because of the improved quality of floc mixture and consistent dosing rate.

III. System Inspections – Specific elements inspected and finding

- N/A

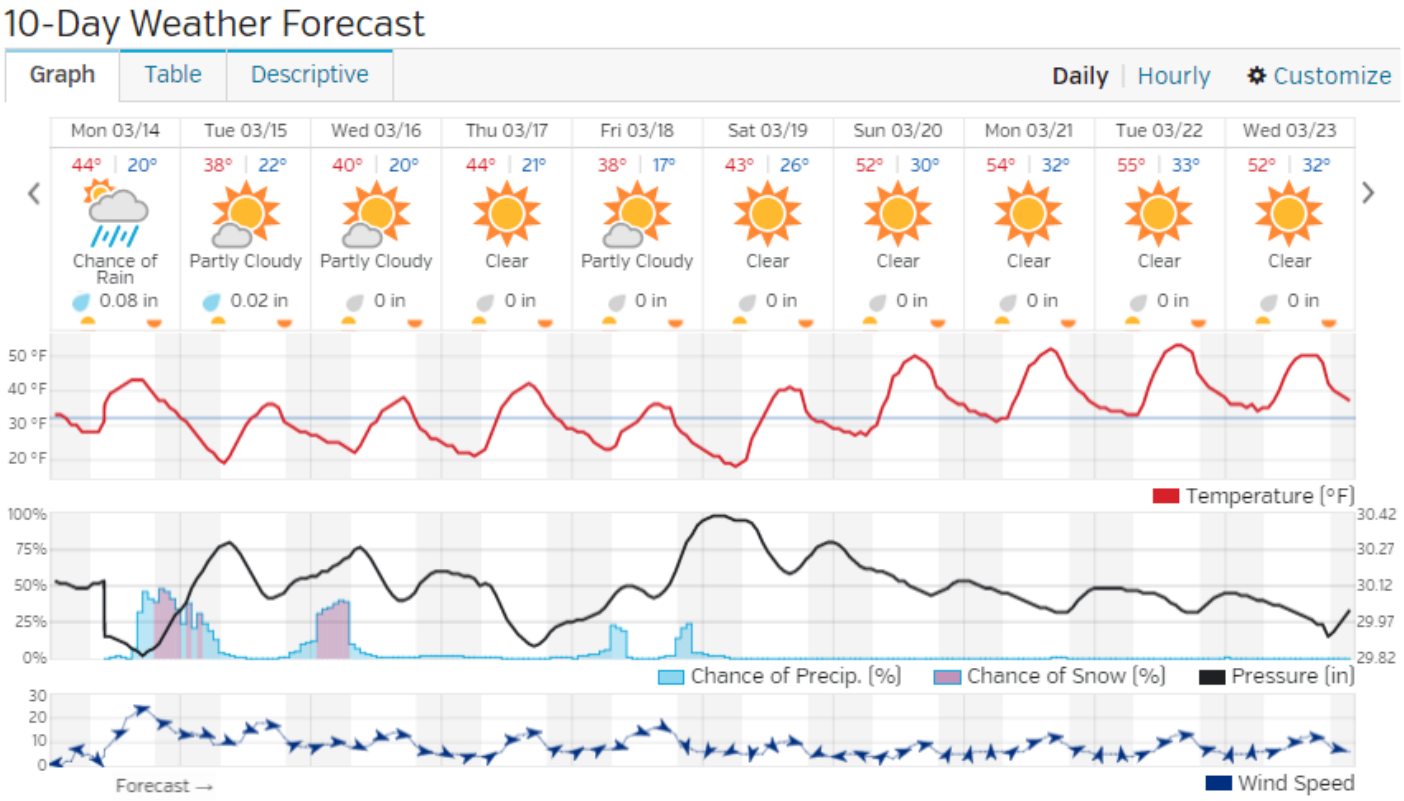
IV. Site Status

Personnel and equipment onsite

- Alexco currently employs three full-time employees (FTE) who live in Silverton that oversee operations at the Gold King IWTP.

Weather conditions

- Weather Underground Report for Silverton, CO (3/14/2016 – 3/23/2016)



Site Images

Figure 1: Site from Cell D – Taken on 3/8/2016

Figure 2: Solar panel and pressure transducer at Pond 2 – Taken on 3/8/2016

Figure 3: Solar-powered pressure transducer near the discharge point of Cell D – Taken on 3/9/2016

Figure 4: Discharge from IWTP – Taken on 3/9/2016